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HARD CHOICES

A Report on the Increasing Gap Between America's Infrastructure Needs and Our Ability To Pay for Them

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Appendix 18. OKLAHOMA

A CASE STUDY

PREPARED FOR THE USE OF THE

SUBCOMMITTEE ON ECONOMIC GOALS AND INTERGOVERNMENTAL POLICY

OF THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES

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Preface

Infrastructure problems are widespread. They do not respect regional or state boundaries. To secure a better data base concerning national and state infrastructure conditions and to develop threshold estimates of national and state infrastructure conditions, the Joint Economic Committee of the Congress requested that the University of Colorado's Graduate School of Public Affairs direct a twenty-three state infrastructure study. Simultaneously, the JEC appointed a National Infrastructure Advisory Committee to monitor study progress, review study findings and help develop policy recommendations to the Congress.

In almost all cases, the studies were prepared by principal analysts from a university or college within the state, following a design developed by the University of Colorado. Close collaboration was required and was received from the Governor's staff and relevant state agencies.

Because of fiscal constraints each participating university or college agreed to forego normal overhead and each researcher agreed to contribute considerable time to the analysis. Both are to be commended for their commitment to a unique and important national effort for the Congress of the United States.

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OKLAHOMA BACKGROUND

Similarly to many western and southern states, Oklahoma is experiencing a transition from a rural-agricultural dominated economy to an urban-industrial one. While agriculture, oil and gas production, and government remain the major employers, a more diversified, industrial economy has been emerging over the past two decades.

In the seventies Oklahoma's economy expanded rapidly, largely spurred on by oil price increases. Population rose over 18 percent to 3,177,000 in 1980 and per capita income tripled to $10,247 in 1981. Unemployment has remained low--typically between 3 and 8 percent (Peirce and Hagstrom 1983). Prosperity encouraged immigration, making Oklahoma one of the fastest growing states in the nation. Recently, many of these trends have slowed or reversed.

The collapse of world oil prices has been the primary factor behind the decline in the state's economy. In March 1983 unemployment rose to 8.8 percent. State and local governments report falling tax revenues and growing welfare rolls.

A primary effect of economic changes over the last thirty years has been urbanization and rural depopulation. In 1950, 63 percent of Oklahoma's population lived in nonmetropolitan rural counties. By 1975 almost half (49 percent) lived in the eleven counties that make up the Oklahoma City and Tulsa metropolitan

areas (Lage, Moomaw, and Warner 1977). The trend toward urbanization is expected to continue. Oklahoma City is projected to have a population in excess of one million by the year 2000, and six new metropolitan communities will have emerged (Bovee 1983a).

Rural depopulation has been most evident in western Oklahoma. Of the 22 nonmetropolitan counties that lost population between 1950 and 1975, 17 were in western Oklahoma. In the next twenty years, falling rural incomes, water scarcity, and declining oil and gas reserves will encourage further emigration from western counties.

Urbanization and rural depopulation pose two distinct and different problems for Oklahoma public services. First, urbanization has progressed faster than local governments' capacity to provide necessary public services. Even the major city governments have been unable to keep up with the demands made by their growing populations. Urbanization has stretched the resources of traditionally underdeveloped areas and necessitated high capital expenditures.

The potential exists to solve these problems in many of the larger cities which have an adequate tax base and the necessary expertise and manpower. However, for many cities, bond issue capacity is limited to general obligation bonds by the state constitution. These must be approved by the voters first and paid out of general property tax. Only one other state does not permit cities to issue revenue bonds directly. In the last twenty years voters have not been inclined to pass large bond issues; consequently, some cities have had to postpone expensive capital investments.

This has contributed to the pressure on urban infrastructure. In addition, small towns often cannot rely on bond sales to finance large scale improvements, since their low revenue capacities discourage potential bond buyers. Sometimes they must resort to private fund raising to finance needed improvements.

One alternative is to establish public trusts, whereby the city and the trust jointly manage a particular government service and directly issue revenue bonds. This strategy has been particularly successful in financing the expansion of Will Rogers World Airport in Oklahoma City and the Tulsa International Airport.

Rural infrastructure problems result from depopulation and economic decline. Less densely settled populations require a more widely dispersed infrastructure which services fewer people. Further, depopulation and slow growth have eroded rural governments' tax bases. They are becoming increasingly unable to pay for services at a time when natural decay necessitates heavy capital expenditures.

In recent years more stringent environmental regulations have aggravated problems of rural counties. Many have had to construct new waste water treatment plants rather than dumping waste water directly into creeks and rivers. While improving public health in these areas, pollution standards have increased the stress on the resources of rural communities. In addition, counties and small towns frequently lack the expertise and/or authority to deal with these problems. Proliferation of special districts, while

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frequently providing valuable services, has also made it more difficult for some cities to take a comprehensive approach.

On the whole, the rural nonmetropolitan counties have been unable to adequately maintain their infrastructure. Many sewer lines, waste treatment plants, roads, and bridges are approaching or have already exceeded their design life. In some poorer communities, roads have been bulldozed because maintenance funds are unavailable, water must be boiled before use, and untreated sewage is being discharged directly into rivers.

Historically, most state and local expenditures have been for noninfrastructure purposes. Infrastructure projects accounted for only 25 percent of all state and local spending between 1973 and 1982. Most of that went on maintenance and operation rather than development. The state has increased spending on railroads and bridge replacement, but this has meant a redistribution of infrastructure spending rather than real growth.

A major question which will influence the capacity of the state to respond to infrastructure problems is the future prosperity of the oil and gas industry. Oklahoma levies a 7 percent gross production tax on oil and gas. During the seventies, though oil and gas production rose by only 8 percent, oil price increases boosted production tax revenue from $68.8 million in 1973 to $721.1 million in 1982 (Warner et al. 1983). The current fall in the price of oil has deprived the state of millions of dollars in revenues. Federal outlays to the state have also declined. In 1973 about 35 percent

of all state revenues came from the federal government. By 1982 this proportion had fallen to 18 percent.

METHODOLOGY

Information for this report came from a variety of state and local government reports and from interviews with many public officials. Availability and quality of the data varied considerably across the categories of infrastructure needs. For example, very little is known about the condition of the infrastructure in the nonmetropolitan counties. Few rural governments have the necessary resources for comprehensive needs assessment. Data problems are compounded because "infrastructure" per se is not a single policy area. Thus, a comprehensive, integrated information system on infrastructure has not been developed.

Many state and local agencies are in the process of updating and reassessing their capital plans. Thus, some of the data in this report will need to be updated within a relatively short time period. However, given the clear direction of the trends identified in this report, it is very likely that infrastructure problems will be an emerging and significant issue in Oklahoma during the remainder of the century.

HIGHWAYS

Summary

Oklahoma's roads and highways are rapidly deteriorating. Many are already inadequate to service existing traffic demands. Although this problem is worse in rural areas, the state highway system and municipalities are not immune, and the state has been unable to fund needed improvements.

BACKGROUND

Oklahoma's highway system consists of over 110,000 miles of roads (Laverents and Enevoldsen 1983), most of which is made up of the state highway system, the county road system, and city streets (see Table 1).

In the 1970's travel on Oklahoma's roads rose steadily. Over a million more vehicles were registered in Oklahoma, and per capita yearly travel increased by 1,500 miles. By the year 2000 nearly 4 million vehicles will be registered in Oklahoma (there were 2.78 million in 1978), and per capita yearly travel will probably have risen to 11,000 miles (Okla. Dept. of Transportation. Planning Div. 1983). Highway spending accounts for 98.7 percent of all state spending on transportation (Warner et al. 1983). Oklahoma provides service for roads and streets in three ways: (1) the Oklahoma Department of Transportation manages the state highway system; (2) the road maintenance and construction programs of

TABLE 1: TOTAL ROAD MILEAGE IN OKLAHOMA BY SYSTEM CLASSIFICATION

	Total Miles In System
County Roads	86,500
State Highways	12,423.52
City Streets	10,300
Turnpikes	486
Park and Forest Roads	355

Source: Laverents and Enevoldsen 1983.

counties and cities; and (3) the turnpike authority which operates the six major toll roads in the state. The most important of these is Oklahoma Department of Transportation. In 1982, 63 percent of all spending on transportation for state roads was attributable to the Oklahoma Department of Transportation (Warner et al. 1983) (Table 2). Federal funding is very important to the State Highway System. As Table 3 illustrates, 93 percent of the State Highway System is eligible for assistance from the federal aid system.

REVENUE SOURCES

The State Highway System.

The Oklahoma Department of Transportation's highway activities are financed by state appropriations, state earmarked revenues, and federal highway trust fund appropriations. Table 4 shows the contribution these sources made to the Oklahoma Department of Transportation budget between 1978 and 1983. In 1981, state

TABLE 2: DISTRIBUTION OF HIGHWAY SPENDING BY SYSTEM, 1973 AND 1982

	Percent Share Of Spending In FY 1973	Percent Share Of Spending In FY 1982
State highway system	60.9	62.6
Toll roads	12.9	6.4
Counties and cities	26.0	29.7
Other transportation	0.2	0.3
	100.0	99.0a

Source: Warner et al. 1983.

[a]Total does not add due to rounding.

TABLE 3: TOTAL SYSTEM MILES BY FEDERAL AID SYSTEM

System Classification	TOTAL SYSTEM MILES	
	Number Of Miles	Percentage Of Total State Highway System Milage
Federal Aid System		
Primary	5,304.92	43
Secondary	5,040.30	41
Urban	293.23	2
Interstate[a]	925.92	7
Total		
Non-Federal Aid System	859.15	7
Total	12,423.52	100

Source: Oklahoma Dept. of Transportation, Planning Div. 1983.

[a]Turner, Will Rogers, and H. E. Bailey Turnpike miles included (260 miles).

TABLE 4: OKLAHOMA DEPARTMENT OF TRANSPORTATION FUNDING SOURCES, 1978-83

	State Earmarked Revenues		State Appropriation		Federal Appropriation		Total
Fiscal Year	$millions	% Of Total	$millions	% Of Total	$millions	% Of Total	$millions
1978	72.1	40	40.3	22	69.2	38	181.6
1979	75.9	36	56.3	26	80.4	38	212.6
1980	74.1	31	77.2	32	87.5	37	238.8
1981	75.7	21	183.2	51	96.8	27	355.7
1982	80.9	25	162.0	49	88.5	27	331.4
1983	73.0[a]	18	157.0	39	169.9[a]	42	399.0

Source: Oklahoma Dept. of Transportation. Planning Div. 1983, 10; Laverents and Enevoldsen 1983, 9-10.

[a]1983 revenues based on estimated fuel consumption.

appropriated funds (51 percent) became the principal source of funding compared to federal appropriations (27 percent) and state earmarked revenues (21 percent). Because the Oklahoma Department of Transportation budget traditionally has been decided last of all departments, its appropriation has amounted to the unrestricted funds not apportioned for other purposes. Thus, it has not been based primarily on state needs for road repair and upgrading.

The largest component of earmarked state revenues is the gas tax, which has been 6.58 cents per gallon from 1949 through 1983. Special fuel taxes and overweight truck permits also contribute a small amount. Today only Texas has a lower gas tax than Oklahoma, and only 55 percent of the tax goes directly to the Oklahoma Department of Transportation. County and municipal programs receive the remainder. Increases in the revenue from this tax, then, have come entirely from higher gas consumption. However, more efficient automobiles, the 55 miles per hour speed limit and less recreational driving have caused the number of taxable gallons of gasoline to decline. In 1978, 1.8 billion gallons were available; by 1983, only 1.3 billion gallons were taxed (Oklahoma Senate 1983c). Despite increased highway travel, state earmarked revenue is expected to continue to fall (Oklahoma Senate 1983c).

Revenues from the federal highway trust fund are an important contributor to the Oklahoma Department of Transportation's budget. However, as Table 5 illustrates, Oklahoma remains a "donor state." Only 61.9 percent of the $1.1 billion Oklahoma contributed to the trust fund in the seventies was returned to the state (Laverents and Enevoldsen 1983).[1] Oklahoma was fiftieth in the nation in the ratio of trust fund apportionments to contributions in 1981 (Oklahoma Senate 1983c). Forty-one states get 90 percent or more of their contribution returned to them; 36 get more than a 100

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[1]Trust fund apportionments are determined on the basis of a formula which uses total road mileage, population, and population density as key variables. Because of its low population density, Oklahoma does not receive its fair share of trust fund apportionment.

TABLE 5: OKLAHOMA'S CONTRIBUTION TO AND RETURNS FROM THE FEDERAL HIGHWAY FUND: BEFORE AND AFTER THE NEW TAX 1979-1986

Fiscal Year	Percentage of Taxes Returned to Oklahoma	Oklahoma's Contribution to the Donor States (millions of dollars)
Before New Tax		
1979	62.9	$47.4
1980	73.2	32.0
1981	84.0	18.4
1982[a]	74.3	30.6
After New Tax		
1983[b]	84.0	32.3
1984	80.4	46.3
1985	80.7	48.1
1986	81.6	49.6

Source: Oklahoma Dept. of Transportation. Planning Div. 1983.

[a]1982 tax returns based on estimated fuel consumption.

[b]1983-86 data based on Federal Highway Administration estimates for highways and Oklahoma Department of Transportation estimates for mass transit.

percent of the contribution. Oklahoma Department of Transportation officials point out that 1,362 miles of inadequate roads and $1.2 billion of critical needs would not exist if the state had received a proportionate share of appropriations since 1957 (Okla. Dept. of Transportation. Planning Div. 1983).

County Roads

County roads are funded from federal revenue sharing and earmarked tax returns. Federal revenue sharing has been used by most counties for road maintenance rather than construction. In 1983, 53 of 70 counties are expected to experience a decline in revenue sharing funds. Earmarked tax revenues come from the state gas tax and the production tax. The decrease in revenue from these taxes has severely strained the building funds of many counties. In FY 80 and FY 81, total county highway funds fell in 18 counties. It is estimated the funds collectively are $40 million per year short of their needs (Oklahoma Senate 1983c).

Municipal Streets

Municipal streets are financed by local taxes, earmarked state revenues, federal revenue sharing funds, and general obligation bond sales. Bond sales typically are available to the larger metropolitan communities like Tulsa, Oklahoma City, and Lawton. In 1982, 60 percent of Oklahoma cities received federal revenue sharing. Normally, between 10 and 25 percent of city road construction and maintenance funds come from this source. (Oklahoma Municipal League 1982). The state's federal revenue sharing is targeted to expire in 1983, however, and elimination of these funds could severely restrict street maintenance operations in many small cities. State earmarked revenues from the gas tax and the bus mileage tax will probably be a more uncertain source of income as available taxable gallons decline. While local property and sales

taxes will continue to provide needed revenue, these sources are inadequate for most cities.

City road programs are likely to face increased pressure. Although complete data are unavailable, it is generally agreed that municipal highway funds are grossly inadequate (Oklahoma Senate 1983c). In 1980 this problem was recognized by the legislature, and $7.4 million were appropriated to improve municipal street conditions. In 1982, the Oklahoma Department of Transportation was mandated to aid the municipalities in the construction and maintenance of access roads to state highways in municipal jurisdictions.

Turnpikes

Oklahoma has seven state owned turnpikes totalling 486 miles (Table 6). They are administered through the Turnpike Authority, an autonomous agency not part of the Oklahoma Department of Transportation. State turnpikes are funded by bond sales, users fees, and earmarked contributions from the gas tax (Laverents and Enevoldsen 1983).

The turnpikes initial construction costs were paid for by bond sales. Turner Turnpike, the states oldest public toll road still in use, paid off its debt several years ago and now contributes $7.5 million annually to other toll roads. In November of 1983, turnpike engineer-manager, E. D. Piersall, announced that the remaining $27.5 million of Will Rogers Turnpike bonds would be paid off in 1984; eleven years ahead of schedule (Young 1983). Piersall

TABLE 6: OKLAHOMA TURNPIKE SYSTEMS

Turnpike	Total Turnpike Miles
Will Rogers	88.5
Turner	86.0
H. E. Bailey	86.4
Indian Nation "A"	41.1
Indian Nation "B"	64.1
Muskogee	53.1
Cimarron	67.1
Total	486.9

Source: Laverents and Enevoldsen 1983.

said the repayment would increased annual available revenue by $8 million. The remaining bonds, due in 2006, amount to $225.9 million.

Originally the legislature set aside $3 million a year from the gas tax to underwrite bond sales. However, the Turnpike Authority recently stated it no longer needed the money and so this subsidy may be curtailed (Young 1983).

Maintenance is a major problem for the Turnpike Authority. Twelve million dollars a year are needed to maintain the turnpikes. In addition, $4.5 million will be needed in 1984 to resurface the Will Rogers Turnpike. Users fees are normally adequate to fund maintenance. in 1983, the average turnpike fare was $2. The fare has only risen by 60¢ since 1954. In November of 1983, Piersall said that fare increases were unlikely, but then because of high maintenance cost it was doubtful Oklahoma would ever see toll-free turnpikes (Young 1983).

INVESTMENT NEEDS AND REVENUES

Adequate information on investment needs exists only for the state highway system. These needs are discussed below.

State Highways

Every two years, a Highway Needs Study and Sufficiency Rating Report is developed by the Oklahoma Department of Transportation, Planning Division. This document summarizes the current condition of the state highway system and projects needs over the next twenty years. The current report addresses planning from 1983 to 2002 (Okla. Dept. of Transportation, Planning Div. 1983). This section is based on projections from that report.

State highways are divided into three functional classes: interstate, trunk, and other highways. Interstate highways are those in the national system of interstate and defense highways within Oklahoma. Trunk highways are rural and municipal roads which serve the major high volume, long distance interstate and intra-state traffic connectors. "Other" highways include all those which are not interstate or trunk.

The overall adequacy of these highways is rated on a hundred point scale against minimum design and construction standards. A sufficiency rating of less than 70 is considered inadequate. The state divides its highway needs into two categories, backlog and accruing. Backlog needs include roads currently classed as inadequate and critically needed new roads. Expected future needs are classed as accruing. Projections of future needs are based on estimates of road conditions, historic rates at which highways

become inadequate or obsolete, and traffic volume through the year 2000.

According to the needs study, 38 percent of state roads are presently inadequate. In addition, 17 miles of interstate and 69 miles of critically needed new roads have yet to be built. This amounts to a total backlog of 4,656 miles. Based on 1982 construction costs, $4.26 billion would be needed to eliminate the current backlog (see tables 7 and 8).

Over the next 17 years the Oklahoma Department of Transportation estimates that needs will amount to 2,800 miles, including 164 miles of new roads. The cost of eliminating these accruing needs will be $1.53 billion based on 1982 construction costs. Thus, the total program needs for eliminating backlog and accruing needs is $5.81 billion.

TABLE 7: TOTAL PROGRAM NEEDS BY CONSTRUCTION MILES 1983-2000

State Functional Classification	Backlog	Accruing	Total
Interstate	16.91	0.00	16.91
Trunk	571.84	382.73	954.57
Other	4,067.41	2,429.86	6,497.27
Total	4,656.16	2,812.60	7,468.76

Source: Oklahoma Dept. of Transportation. Planning Division 1983.

TABLE 8: TOTAL PROGRAM NEEDS 1983-2000
(million of dollars)

System	Program Needs
Interstate	
Construction	
Backlog	$ 249.8
Accruing	
Total Const.	249.8
Maintenance	581.4
Engineer & Administration	125.3
Total	$ 956.4
Trunk	
Construction	
Backlog	$ 619.3
Accruing	468.3
Total Const.	1,088.6
Maintenance	473.9
Engineer & Administration	235.4
Total	$1,797.9
Other	
Construction	
Backlog	$2,967.6
Accruing	1,490.7
Total Const.	4,458.3
Maintenance	1,899.0
Engineer & Administration	958.0
Total	$7,315.3
All State Highways	
Construction	
Backlog	$3,836.7
Accruing	1,959.0
Total Const.	5,795.7
Maintenance	2,954.3
Engineer & Administration	1,318.6
TOTAL	$10,068.6

Source: Oklahoma Dept. of Transportation, Planning Division 1983.

In addition, the Oklahoma Department of Transportation will have to budget for increasing highway maintenance costs. As the highway system ages and labor and materials costs grow, maintenance will become a bigger item in Oklahoma Department of Transportation's budget (see Table 8). Maintenance does not mean that roads are brought up to adequate standards; rather, it means that they are maintained in their existing condition and prevented from further deterioration. Total maintenance needs over the next 17 years are projected to be $2.95 billion (Okla. Dept. of Transportation, Planning Div. 1983).

The Oklahoma Department of Transportation bases its revenue projections on two major assumptions (see Table 9). The first is that appropriations from the state's general revenue fund will continue at the current percentages and that earmarked tax rates will not change. Revenue from earmarked taxes is, therefore, based on projected fuel consumption. The second is that Oklahoma will receive close to 85 percent of its contribution to the Federal Highway Trust Fund. This is required by the Surface Transportation Assistance Act of 1982. One penny of the federal gas tax is earmarked for the Mass Transit Fund. As Oklahoma lacks any extensive mass transit system it will not receive its full 85 percent. Expected tax returns are illustrated in Table 9.

In the short term (1983-86) these projections seem optimistic. If inflation remains low, revenues will be sufficient to actually improve the condition of the highway system. By 1986 the state may be able to place 273 miles of highway under construction. This

TABLE 9: FORECAST OF REVENUES FOR STATE HIGHWAY SYSTEM BY SERVICES 1983-2000[a]
(in millions of 1983 dollars)

Fiscal Year	State	Federal	Total
1983-1987	$1,032.3	$ 797.8	$1,830.1
1988-2000	3,612.9	2,245.3	5,858.2
Total	4,645.2	3,043.1	7,688.3

Source: Oklahoma Dept. of Transportation, Planning Division 1983.

[a]The projected state and federal services are those that will become available to the state highway system only. They do not include funds obligated to the Turnpike Authority, lake access roads, park roads, airports, railroads, industrial access roads, and state and federal assistance to county roads. Apportionments of federal funds are based on the Surface Transportation Assistance Act of 1982.

would be the first time since 1968 that the condition of the state highway system would have been improved (Okla. Dept. of Transportation, Planning Div. 1983). Total revenue available to the Oklahoma Department of Transportation for highway purposes to the year 2000 will be $7.69 billion. This means that revenues are estimated to fall short of needs by $2.38 billion (Okla. Dept. of Transportation, Planning Div. 1983). In order to keep in line with expected revenues, maintenance spending will be $801 million less than is needed (see Table 10). Because the Oklahoma Department of Transporation does not engage in long term needs priortization, it is not known how this shortfall will be allocated.

TABLE 10: TOTAL NEEDS AGAINST PROJECTED SPENDING 1983-2000[a] (millions of dollars)

	Projected Expenditures	Projected Needs	Total Deficit
Engineer and Administrative	$ 996.8	$ 1,318.6	$ 321.8
Maintenance	2,152.9	2,954.3	801.4
Construction	4,538.5	5,796.7	1,258.2
Total Program	7,688.2	$10,069.6	$2,381.4

Source: Oklahoma Dept. of Transportation, Planning Division 1983.

[a]Projected expenditures and needs include only those planned for the state highway system.

County and Municipal Highways

Little information exists about county and municipal highways or construction needs for city streets. County roads have not been fully inventoried since 1964. The Oklahoma Senate 89'er Transportation Subcommittee estimated that about 39 percent of county roads were in critical condition and that the counties would need an extra $40 million per year to bring their roads up to standard. As noted above, the purchasing power of county road funds has consistantly declined over the last decade (Oklahoma Senate 1983c). If this decline continues, the counties will be unable to maintain an adequate road system.

In addition to these difficulties the counties lack the expertise to develop a proper highway planning system. In the past the

lack of county standards for road design, engineering, maintenance, and construction has led to unnecessary road works (Oklahoma Senate 1983c). The counties' highway programs will face considerable problems over the next 20 years. However, it should be stressed that until a comprehensive needs and prioritization study is performed the real highway needs of the counties are unknown. Many county roads may be inadequate, but the majority serve an extremely low volume of traffic.

While municipalities are responsible for determining their highway needs, only Tulsa and Oklahoma City have the capacity to do so. An Oklahoma Municipal League survey found that out of 570 Oklahoma cities surveyed, Oklahoma City and Tulsa were responsible for 50 percent of total municipal highway spending (see Table 11).

Both Tulsa and Oklahoma City have extensive planning systems, and they are in the process of updating their highway capital improvement plans. In its 1980-82 capital improvements plan, Oklahoma City estimated that about $156 million would be needed to eliminate urgent highway needs. This excluded funding estimates for the West By-Pass which, though badly needed, is a high dollar long-term project which cannot be funded in the near future.

Similarly, Tulsa has an extensive planning system. Its existing highway plan calls for 80 to 90 miles of arterial streets and 30 miles of expressway to be built by the year 2000 (Tulsa Dept. of City Development 1982). Over the next five years 30 miles of arterial improvements costing approximately $11.5 million (1982 dollars) will be needed. In addition, surface replacement needs

TABLE 11: TOTAL EXPENDITURE FOR ROADS AND STREETS IN 570 OKLAHOMA CITIES BY CATEGORY--1981-82
(millions of dollars)

	Construction		Operation and Maintenance		Street Lighting		Other[a]		Total	
	Actual $ Spent	% of Total	Actual $ Spent	% of Total	Actual $ Spent	% of Total	Actual $ Spent	% of Total	Actual $ Spent	% of Total
Tulsa	5.27	14	4.49	26	0.99	19	12.00	37	22.76	25
Oklahoma City	11.37	30	4.19	25	1.29	25	6.10	18	22.96	25
Other Cities	20.77	56	8.26	49	2.87	56	14.66	45	46.56	50
Total	37.41	100	16.94	100	5.15	100	32.76	100	92.28	100

Source: Oklahoma Municipal League 1982.

[a]"Other" includes all spending on personnel services and all other capital outlays not covered in the above categories, e.g. equipment, buildings, etc.

will total $500,000 annually (Tulsa Dept. of City Development 1982).

The City of Tulsa has developed many funding sources for its capital improvements plan. In 1980, Tulsa residents approved a third penny sales tax, and in May 1983 they approved a $94.3 million bond issue of which $51 million is earmarked for street construction over the next four years. It will be used to purchase right-of-way and build one and one-half miles of expressway, improve seven intersections, and build four miles of arterial roadway. Tulsa will continue to depend on federal and state funds to meet the highway improvement plan.

BRIDGES

Summary

Over half Oklahoma's bridges are currently in an inadequate condition, and many are completely unsafe. This problem is most pronounced in rural areas. State, county, and local government budgets for bridge improvements are too small to meet Oklahoma's bridge repair needs. The County Bridge Program established by the legislature in 1980 has helped alleviate the problem, but this program will require larger appropriations in the future.

BACKGROUND

Prior to 1980, the county commissioners were responsible for bridge construction and maintenance. Inadequate funds and lack of expertise led to a decline in many of Oklahoma's bridges. In response to this, the state legislature established the County Bridge Program in 1980 to provide funds and expertise to help rebuild or rehabilitate county bridges. In FY 1981, $18 million was appropriated for the program. However, appropriations fell to $12 million in 1982 and 1983, and further decreases are expected in FY 1984.

Money is allocated on the basis of bridges per mile in each county. The County Bridge Engineer and the County Commissioners then develop a list of bridges, identify needs, and forward these

to the State Transport Commission via the Oklahoma Department of Transportation. If the Commission approves county's funding request, funds are awarded from its allocation of the appropriation. By January 1983, 522 out of 560 requests had been approved (Laverents and Enevoldsen 1983).

Prior to 1980, no comprehensive data were kept on bridge constructions. However, as part of the County Bridge Program, the Oklahoma Department of Transportation has conducted an inventory of all Oklahoma bridges. Though not complete, this survey gives a fairly accurate picture of the current condition of the state's bridges. The survey reports the condition of a bridge in one of three categories: structurally deficient, functionally obsolete, and currently adequate. "Structurally deficient" means that the bridge is in poor structural condition and is unable to support the load for which it was designed. "Functionally obsolete" bridges are those which have a poor alignment to the adjoining road or are narrower than the road. "Currently adequate" bridges are both structurally sound and safely aligned to the roads adjoining them (Goins 1983).[1]

As Table 12 illustrates, 53 percent of Oklahoma's bridges are structurally deficient or functionally obsolete. The cost of rectifying these faults is $1.3 billion (Table 13). This includes $1.1 billion for county bridges alone, of which 6,944 have a

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[1]No projections about the future condition of bridges is included in the survey nor are future maintenance and replacement costs addressed. The survey only deals with current considerations and estimates reconstruction costs.

TABLE 12: CURRENT CONDITION OF OKLAHOMA BRIDGES, 1983

Current Condition	County No.	County %	Urban[a] No.	Urban %	State No.	State %	Total No.	Total %
Structurally Deficient	8,081	54	68	15	152	2.3	8,301	38
Functionally Obsolete	2,923	19	17	4	504	7.6	3,444	15
Currently Adequate	4,050	27	380	81	5,929	90	10,359	46
Total	5,054	100[b]	465	100	6,585	100	22,104	100

Source: Goins 1983.

[a]The urban bridge survey is incomplete.

[b]Percent totals may not add due to rounding factor.

TABLE 13: ESTIMATED COST OF REPAIRING OR REPLACING DEFICIENT OR OBSOLETE BRIDGES 1983 (millions of dollars)

Current Condition	County	Urban	State	Total
Structurally Deficient	$ 878.0	$11.84	$ 76.4	$ 966.24
Functionally Obsolete	264.0	2.57	140.0	406.57
Total	$1,141.0	14.41	$216.4	$1,372.81

Source: Goins 1983.

capacity less than 8 tons, the weight of a fully loaded school bus. It would cost $754.4 million to increase their capacity to over 8 tons (Goins 1983).

This situation led legislators, engineers, and county officials to claim that Oklahoma is experiencing a county bridge crisis (Maciula n.d.). However, it is important to remember that no comprehensive prioritization of needed repairs has been undertaken. Many county bridges serve only a few families. Since low volume traffic poses little threat to the bridge users' safety or convenience, repairs could be safely postponed or eliminated. Other bridges, due to their high volume of traffic, need immediate repair. Thus, true needs of the county bridge system are probably not revealed by the bridge survey. For instance, although 6,944 county bridges may not be able to support a school bus, it is not known how many bridges are on school bus routes.

The costs of repairing state highway and municipal bridges will be paid out of normal road building and maintenance funds. How much stress this will place on these sources is unknown. Since the Oklahoma Department of Transportation and the municipalities include bridge maintenance and reconstruction as part of their roads estimates, data on past expenditures are unknown.

The Bridge Division of the Department of Transportation is slowly developing a list of priorities. The Norman and Thomas bridges across the South Canadian River and the Packsaddle Bridge have been identified as needing special attention. It is estimated they will cost $23 million to repair. At present the Oklahoma

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Dept. of Transportation, Bridge Division lacks the information to make projections about bridge needs to the year 2000. Future investment and revenue needs are, therefore, unknown.

RAILROADS

Summary

Track abandonment and a decline in rail service has plagued Oklahoma throughout much of this century. With the liquidation of the Rock Island line in the 1970's, the situation became even more serious. The Oklahoma legislature responded to these problems in two ways: (1) by establishing the Railroad Maintenance Revolving Fund for line rehabilitation with appropriations of over $4 million from 1978 to 1982; (2) by appropriating $22 million from the general fund for line acquisition and rehabilitation. While federal funds for rail planning and rehabilitation of lines has amounted to almost six million dollars since 1977, federal grants are likely to diminish in the future. Since total rehabilitation and acquisition needs have been estimated at $129 million, investment needs greatly exceed available public funds.

BACKGROUND

Oklahoma is criss-crossed by rail lines, totaling 4,420 miles in 1982 (Okla. Dept. of Transportation 1983b). Of the total, 2,505 miles are mainline (carrying more than 5 million gross tons per mile annually), and 1,915 are branch lines (carrying less than 5 million gross tons per mile annually). Currently, the rail system in Oklahoma only carries freight. Passenger service has not

operated in Oklahoma since the Lone Star Chicago-Houston was discontinued in 1979.

Class I railroads operating within the state (annual gross revenues of $50 million or more) include: Atchison, Topeka and Santa Fe; Burlington Northern; Kansas City Southern; Missouri-Kansas-Texas; Oklahoma-Kansas-Texas; Missouri-Pacific; and St. Louis Southwestern (Bivens and Associates 1981, III-13).[1] According to annual reports filed with the Oklahoma Corporation Commission, over 92 million tons of revenue freight were handled intrastate by Class I carriers in 1982. As expected in an agricultural state, farm and food products comprise a substantial portion of goods hauled, 23 percent and 8 percent respectively. Other major products transported are: coal (25 percent); coal and petroleum products (4 percent); chemical commodities (6 percent). These products make up about two-thirds of freight transportation in Oklahoma.

Several industries rely heavily on the railways for transportation and are severely disrupted if service is discontinued. Agriculture, mining, manufacturing, and wholesale and retail trade are all rail-dependent; in 1980 these sectors of the economy employed 48 percent of the state's work force (Bivens and Associates 1981, II-9). Although this is a private sector service, the state of Oklahoma has an interest in maintaining a viable rail freight transportation system.

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[1]No Oklahoma data was included in the St. Louis Southwestern annual report.

The rail situation in Oklahoma, as in the rest of the U.S., has changed dramatically in recent years due to track abandonment and service discontinuance. Abandoned miles of track in Oklahoma totaled 2,039 miles from 1902-1979 (Bivens and Associates 1981, II-14). One-third of those tracks were abandoned in the 1970s. The pattern is expected to continue as maintenance is deferred by companies due to "low traffic volume, poor return on investments, burdensome government regulations, and high capital costs" (Okla. Dept. of Transportation 1981b). Track abandonment is not necessarily a negative occurrence when service on duplicative and/or poorly constructed lines is discontinued. However, once abandoned, service is difficult to restore, and nearly impossible if lines are dismantled. Traffic density is greater in eastern Oklahoma than in the western part of the state, and growth in rail service is expected to continue in the east. Western Oklahoma has been subject to loss of rail service, yet the agricultural sector of western Oklahoma particularly needs such service.

Concern with abandonments led to the passage of the Railroad Revitalization Act in 1978. "The Act authorized the Department (of Transportation) to acquire, construct, reconstruct, repair, replace, operate, and maintain railroad rights-of-way" (Okla. Dept. of Transportation, 1983b). The Act has been interpreted conservatively by the Oklahoma Attorney General and the Oklahoma Supreme Court. Accordingly, federal and private funds must be treated as state funds subject to Oklahoma's constitutional constraints. The state cannot pay money to private lines for rehabilitation or

reconstruction; rather, they must first acquire a line, rehabilitate it if desired, and then may sell, lease, or lease-purchase the line to a private company (Okla. Dept. of Transportation 1983b).

The Rail Act established a Railroad Maintenance Revolving Fund from revenues generated by the Oklahoma Freight Car Tax (Okla. Dept. of Transportation 1983b). From July 1, 1978 to December 31, 1982, slightly more than $4 million was deposited in the fund. The state anticipates an annual average revenue of $800,000 into the fund (Table 14).

Oklahoma rail service was substantially reduced in September of 1979 when the Rock Island (Chicago, Rock Island and Pacific) railroad was liquidated. The Rock Island operated about one-fifth of the rail line in the state, over 1,000 miles, one major north-south railway, the major east-west line and several shorter lines. Rock Island service extended to 46 communities, including Enid, a very important grain storage distribution center (Okla. Dept. of Transportation 1983b).

TABLE 14: ANTICIPATED REVENUE FROM RAILROAD MAINTENANCE REVOLVING FUND

1983-1988	1983-2000
$4,000,000	$13,600,000

STATE ACQUISITIONS

A direct result of the Rock Island liquidation was the entrance of the state in the rail buying business. The groundwork had been established through the Railroad Act of 1978. The state legislature appropriated $12 million in 1980 and another $10 million in 1981 for the purpose of acquiring the Rock Island and any other lines "worthy of being maintained." Several rail lines have been acquired or renovated by the state. They include:

Oklahoma-Kansas-Texas Railroad (the old north-south Rock Island is now a division of the Missouri-Kansas-Texas Railroad system acquisition)	$15,000,000	
Elk City-Hydro Acquisition	3,100,000	(1981)
Elk City-Clinton Rehabilitation	2,078,372	(1982)
Farmrail Signalization Project	895,600	(1982)
Altus-Burkburnett, Texas Aquisition	811,000	(1982)
	$21,884,972	

Source: Oklahoma Dept. of Transportation 1983b, 21.

Lines are acquired in order to be rehabilitated by private companies which, in turn, buy the line back from the state on a 30-year lease purchase basis.

While north-south service of the old Rock Island track has been restored by the Oklahoma-Kansas-Texas Company the east-west Sunbelt route connecting Memphis, Tennessee to Amarillo, Texas has been only partially restored, to the west of Oklahoma City. Service east of Oklahoma City has not been restored. Trustees of the Rock Island are asking $100 million for the remainder of the Sunbelt route.

Funds for the acquisition of the north/south route were a combination of Federal---Federal Railroad Administration Section 505

preference funds ($25 million loaned to the Oklahoma-Kansas-Texas Users Association at 2 percent interest) and Section 511 loan guarantee funds ($15 million loaned to the parent company, the Missouri, Kansas, Texas Co., at prevailing market rates), and the $15 million grant from the State of Oklahoma (Okla. Dept. of Transportation 1983b).

According to estimates based on net liquidation value (the sum of net salvage and land values) all lines approved for or pending abandonment in 1981 would cost $129.4 million for acquisition and rehabilitation (Okla. Dept. of Transportation 1981, b) (Table 15). One rail company is presently spending $80,000/mile on line rehabilitation.

TABLE 15: COST OF ACQUISITION AND REHABILITATION
(approved or pending)

Needed $129.4 million (includes Rock Island lines)		
	Federal Railroad Admin. Project Grants (1980-82) ----	$5,724,649
	Planning Grants (1977-79) ----	237,480
		5,962,129
	State Legislative Appropriation ----------	22,000,000
		$27,962,129
	Funds Expended	$21,064,652

Source: Oklahoma Dept. of Transportation 1983b., 22.

Federal funds either for projects (803 funds) or loans are not expected to continue. State funds will rely solely on the Railroad Maintenance Revolving Fund unless special appropriations are made by the legislature; this appears unlikely given the financial condition of the state. When rail lines are not rehabilitated or saved, truck traffic increases which results in accelerated road damage. The state minimal involvement in rail transport disguises a deep commitment to maintaining Oklahoma's rail system, as demonstrated by the state's intervention after the Rock Island's collapse.

An additional government response to rail needs is that local governments in western Oklahoma have perceived a stake in the continuation of rail service. While local governments are constitutionally unable to financially subsidize rail operation, other arrangements may be worked out. For example, they can spend extra funds on grade crossings, and local chambers of commerce can work on behalf of public interests to subsidize the rails.

MASS TRANSIT

Summary

Except for large commuter bus systems in Oklahoma City and Tulsa, Oklahoma has no significant mass transit. Six small bus systems do receive federal funding, but no passenger rail systems exist.

INVESTMENT NEEDS AND REVENUES

It is unlikely that an attempt to initiate a mass transit rail system will be made in the near future. Conditions of the state economy, state and local revenues, and institutional changes will determine whether one is started by the year 2000. In addition, the type of mass transit needed for Oklahoma is subject to controversy. Because of recent cutbacks in subsidies for mass transit and plans to eliminate subsidies by 1985, the major masstran systems are hesitant to begin long term expansion.

The Oklahoma City mass transit system is owned and operated by the Central Oklahoma Transportation and Parking Authority, a public trust independent of the city. It runs a bus system that operates in a 12 mile radius around a single downtown hub. It also operates a commuter express service to downtown Oklahoma City from a number of outlying suburbs. At present there are no plans to expand the system.

Central Oklahoma Transportation and Parking Authority budget has remained stable for the last two years. It is unlikely that it will increase appreciably any time in the near future. Currently 20 percent of operating revenues are internally generated. The federal government contributes approximately 37 percent to the authority's mass transit operations. The remaining 43 percent comes from the city's general fund and commuter express services. Table 16 illustrates Central Oklahoma Transportation and Parking Authority's mass transit budget between 1979 and 1982.

Unlike any other state, Oklahoma gives no assistance to local mass transit. This is based on a state law which prohibits the use of state funds to subsidize private companies. At present a bill is being considered by the legislature to set up regional transport districts that could provide financial aid to local mass transit.

After 1985, federal mass transit operating subsidies are due to be eliminated. If this happens the Oklahoma City bus system will

TABLE 16: CENTRAL OKLAHOMA TRANSPORTATION AND PARKING AUTHORITY, TRANSPORTATION DIVISION. REVENUE BY SOURCE, 1979-82

	Operational Revenues	Inter-governmental Grants	Transfers for the General Fund	Total
1979-80	$1,280,757	$2,016,392	$1,405,443	$4,702,592
1980-81	1,582,375	2,979,519	1,751,319	6,313,213
1981-82	1,525,972	3,693,075	2,164,132	7,383,179

Source: Oklahoma City 1982.

be deprived of 37 percent ($3.3 million) of its operating revenues. Unless either the state or Oklahoma City is willing to contribute extra monies or funds are increased dramatically, it is extremely unlikely that COPTA's mass transit operations can continue at current levels.

The Tulsa bus system is run by the Metropolitan Tulsa Transit Authority. The authority is a public trust independent of the city, and operates 99 buses, primarily to serve the downtown area. Approximately one-third of it's revenue comes from internally generated sources. Another third comes from federal sources and the remainder from the city of Tulsa. No major expansion plans currently exist.

Metropolitan Tulsa Transit Authority officials identify the major problems faced by the system to be funding (after the federal cutoff in 1985), changing routes as population and business shift away from small towns, and encouraging a more favorable public image towards mass transit (Littlefield 1983).

Six small rural bus systems are funded through the "Section 18" Program, which provides formula grants to nonurban transit systems in areas with populations under 50,000. Only four areas in Oklahoma are ineligible for this program (Oklahoma City, Tulsa, Enid, and Lawton). The program is administered in Oklahoma by the Oklahoma Dept. of Transportation's Planning Division. The legal prohibitions on state money being used to subsidize private companies prevented the Section 18 Program from operating until recently. However, in May of 1982, the State Supreme Court decided that the

Oklahoma Dept. of Transportation did have the authority to disburse federal and state funds to private companies, and beginning in the summer of 1982, the Department began to operate six Section 18 projects. These are Little Dixie Transit (Hugo), Kibois Transit, Southwest Transit (Altus), Rural Transit (Frederick), Owassa Public Transit, and Carter County Transit (Ardmore). Carter County Transit has been functioning since 1978 and was taken into the Section 18 Program when it began to operate.

These systems are funded by federal and local funds; 80 percent of nonoperating expenditures come from federal sources and 20 percent from local sources. Operating costs are split 50-50 between federal and local funds. A variety of local funds are used to meet the local match. However, half must be put up in cash or in-kind payments such as volunteer drivers. Most local systems charge a minimal fare. The Section 18 Program is due to continue until 1986. However, few systems could exist if federal operating subsidies are terminated as scheduled in 1985 (Larue 1983).

Any Oklahoma mass transit system faces a number of unavoidable problems. The small, widely dispersed population of rural Oklahoma tends to make it difficult to operate an economic mass transit system. The geographic size of Oklahoma City also makes it difficult to cover the entire city effectively. Further, Oklahomans appear to strongly favor automobile transportation (see "Highways" above), thus it has been difficult to generate a public commitment to mass transit. Nevertheless, mass transit may be one solution to the increasing problems of urban congestion in Oklahoma and a potentially important part of an integrated statewide transportation policy.

AIRPORTS

Summary

Oklahoma has sufficient airports to service current commercial and general aviation demand. Will Rogers World and Tulsa International airports, Oklahoma's major commercial airports, are financially secure and will be able to fund future needed developments. General aviation airports are in worse condition. Many are badly maintained and unable to serve current demand. Heavy capital investment will be required for these airports to meet future demands; this will almost certainly require financial support from state or local governments.

BACKGROUND

In 1979, 177 of Oklahoma's 279 airports were open to the public. Tulsa International and Will Rogers World (Oklahoma City) handled over 96 pecent of air carrier enplanement in Oklahoma in 1975 (Oklahoma Aeronautics Commission 1979). Both are medium-hub, multi-purpose airports whose flights connect major airports and which serve carriers and general aviation. Airports in Enid, Lawton, McAlester, Ponca City, Duncan, and Bartlesville have recently received scheduled commercial service.

Most airports are classified as "general aviation use" airports. "General aviation" is defined as all flying not classified

as air carrier, commuter or military. In 1975 (latest available figures) 4,204 aircraft were based at these airports (Oklahoma Aeronautics Commission 1979); 80 percent of these were light single-engine aircraft. These airports are normally owned and operated by the municipality.

Air travel in Oklahoma has fluctuated considerably in recent years. The coincidence of federal deregulation and the oil boom encouraged a rapid expansion of air transport in the late 1970s and early 1980s. The current economic downturn has led to a general decline in air travel, especially in general aviation flying (Perry 1983).

NEEDS

In 1979, air travel and investment needs for Oklahoma's airports were forecasted in the Oklahoma Airport System Plan (Oklahoma Aeronautics Commission 1979). It contains real financial data for the 1975-77 period, and forecasts to the year 2000. A new plan is under preparation (July 1983).

Oklahoma's Airport Systems Plan characterizes the adequacy of airports to handle current or expected capacity. Capacity can be effected by improvements or deterioration of airport facilities and by changes in the fleet mix using the airport. Thus, if the number and type of aircraft using an airport changes, capacity may become inadequate even though facilities remain unchanged. The Oklahoma Aeronautics Commission inspects airports and makes recommendations for improvements. The Commission has identified three

major maintenance deficiencies associated with smaller general aviation airports: (1) the asphalt surfaces of runways tend to be cracked due to weathering; (2) grass encroaches onto the runways; and (3) inadequate attention is given to airport buildings. The degree to which these deficiences affect Oklahoma airports is unknown.

Projections of future needs are even more difficult when the administration of airports is considered. With the exception of Oklahoma City and Tulsa, publicly-owned airports are run by municipal airport committees, consisting of representatives of the municipality and people interested in local aviation. The effort devoted to airport maintenance is almost entirely up to the discretion of the committees. While some are deeply committed to local aviation and maintain their airports very well, others are largely indifferent to the condition of local airports. Because committee composition can change rapidly, projections of airport conditions in the future are very uncertain.

Oklahoma City Airports

The City of Oklahoma City runs Will Rogers World, Wiley Post, and Clarence E. Page airports. Will Rogers World Airport is the largest of these, consisting of 7,500 acres and three major runways. Enplanements currently (July 1983) run at 1,400,000 per year (Morton 1983). The airport is owned by a public trust.

The airport is currently engaged in a large scale, long term expansion of terminal and runway capacity. Parking spaces have been doubled to 3,500 at a cost of $11 million. The construction

of the category II runway and taxiway was completed in 1981 at a cost of $14 million. The federal government paid 75 percent and the trust 25 percent in local matching funds. Terminal expansion will take place in phases:

(1) Expansion of the east side terminal by 40,000 square feet, to be completed in 18 months and cost $3.5 million;

(2) Renovation of the existing terminals costing approximately $3.5 million; and

(3) Expansion of the westward terminal.

These improvements must be funded by local sources since federal dollars cannot be used for terminal expansion.

Long term development is more uncertain. In an attempt to clarify future needs and alternatives, airport authorities have recently initiated a study on the airport's future. One possibility is that the airport might be expanded through satellite terminals linked by underground tunnels. Linking Will Rogers to downtown Oklahoma City by a monorail is also under consideration. Cost estimates for these projects do not exist.

Tulsa Airports

The Tulsa Airport Authority, a charter agency of the City of Tulsa, operates Tulsa International and Richard Lloyd Jones, Jr. airports. Tusla International is a medium-hub serving air carriers as well as general aviation. Richard Lloyd Jones, serving general aviation only, is the busiest airport in the State of Oklahoma in total aircraft operations (take-offs and landings). Tulsa International, the second busiest in the state, was served by 14 air carriers and enplaned 1,270,190 passengers in 1982. The Tulsa

Airports Improvement Trust acts as the financing agent for capital improvement projects at both airports (Arnot 1983).

Both Tulsa International and Richard Lloyd Jones continue to expand with recent land purchases. At Tulsa International, two new cargo facilities were recently completed; the primary 10,000 foot runway was reconstructed; the terminal was doubled in size and refurbished; and a two-level parking structure expanded to more than double the available parking spaces. Revenue bonds were sold by the Trust to finance all improvements, with federal aid received only for the runway reconstruction. Currently, the terminal apron is being reconstructed under a 22-month contract, with completion set for Spring 1985.

Long range plans included in the current Master Plan are acquistion of additional land, the construction of a third, north/south runway of 10,000 feet, additional taxiways, and the lengthening and strengthening of one runway. A contract was recently signed for a Tulsa Metropolitan Area Airport Systems Plan study to determine the need for additional airport facilities in the Tulsa Metropolitan Area. In addition, a Land Use Plan Study is underway for Tulsa International.

At Richard Lloyd Jones, an area is currently being developed and leased which will ultimately contain over 100 privately owned hangars. In addition, one of the north/south runways is scheduled to be lengthened and the installation of an Instrument Landing System is planned.

REVENUE

Whatever improvements are required at general aviation airports, adequate funding is not likely to be available. Oklahoma Aeronautics Commission officials feel that an 800 percent increase in funding will be needed to adequately maintain airports (Perry 1983).

At present general aviation airports are funded from revenue generated by the airports, federal and state contributions, and private donations. There are three major sources of revenue generated by the airports. First, user fees which include hangar rentals, tie down rent, and fuel flowage fees. Considerable variation exists in how much money can be generated by these fees. Hangar rent, for instance, varies from $2 a month in small airports to $250 a month in larger airports for "executive hangars." Second, revenues generated by appropriations from local taxes and bond issues. Since small cities lack the revenue capacity and airport improvements are rarely perceived as priority problems, this is a realistic option only for larger communities. Third, revenues from leasing surplus land for nonaviation purposes, such as industrial or agricultural uses that are not detrimental to aviation safety, and the leasing of hanger space for storage purposes is also common. Even with these revenue sources, typically only larger airports are capable of complete self-financing.

The state provides grant funds through the Oklahoma Aeronautics Commission to municipalities for airport planning and development. Total grant money available is determined annually by the

legislature as part of the Oklahoma Department of Transportation's appropriation. The Aeronautics Commission fund determines the level of individual grants and municipal requirements. In the past, grants have tended to go to the more active and wealthier local authorities. This can be attributed to the interest of their airport committees in airport development and the high (two-thirds) matching fund requirement normally made for grants.

In the past, larger airports have been able to count on federal funds. However, recent cutbacks in federal revenues suggest that airports cannot continue to rely on this source. Private donations have provided an occasional boost to local funding and generally take the form of direct donations of labor or expertise from groups such as flying clubs.

Tulsa and Will Rogers World airports are self financing. User fees normally cover all their operating costs. At Will Rogers World about $4.5 million annually is contributed to the airport's trust fund; this is about 1.5 million more than normal operational costs. In addition, bond sales and state and federal funds have helped to provide terminal travel parking, garage improvements, and other development.

It is difficult to assess the future needs of Oklahoma's air transport system. While the major airports appear to be thriving, general aviation airports face funding difficulties. Unless more funds are found, the capacity of these airports may decline as demand for service increases. However, because demand is generally small at many of these airports, deterioration will primarily affect leisure flying rather than the general public.

WATER

Summary

Oklahoma faces an abundance of water supply in the east and a scarcity of supply in the west. Investment needs for water resources development through out Oklahoma amount to nearly $3,8 billion (1982 dollars). In addition to development needs, 350 communities, mostly in eastern Oklahoma, have water distribution and treatment problems with estimated costs of $400-$500 million. In addition, over 700 community water supply systems suffer a range of problems from contamination to insufficient design and quantity. No estimates of the cost to reduce those problems exist.

BACKGROUND

Oklahoma's water resources reflect two very different geographies and climates which characterize the state. Eastern Oklahoma is hilly, wooded, and more typical of western Arkansas and western Missouri. It is a humid area with an average yearly rainfall ranging up to 56 inches in the southeast. By contrast, western Oklahoma is a semi-arid region with a geography typical of western Kansas and the Texas panhandle and with little precipitation. Average rainfall in the Oklahoma Panhandle (northwest) is 15 inches per year.

Two major rivers, the Arkansas and the Red River, drain the state (2/3 and 1/3 respectively). As they flow through eastern Oklahoma on their way to the Mississippi they become much stronger. The average annual amount of water leaving the state through these river basins is 34 million acre-feet. The water quality of the two rivers is considered poor (Oklahoma Water Resources Board 1980a, 156).

Much has been done to change the water picture in Oklahoma. Fifty lakes were constructed from 1920 to 1980, and five more are authorzed (Oklahoma Water Resources Board 1980a, 60). As a result, major reservoirs comprise 663,000 acres with a total capacity of 3.77 million acre-feet. Reservoir development projects have been more numerous and of larger size in eastern than in western Oklahoma. Reservoirs serve multiple purposes including: flood control, conservation, municipal and industrial supplies, irrigation supply, water quality control, recreation, navigation, and hydropower generation. In addition about 450,000 acres of farm ponds exist throughout Oklahoma. As a consequence of man's activity and 23,000 miles of streams, Oklahoma is third nationally in fishable fresh waters. Because stream water generally is not sufficient to meet the states water needs, ground water has become a major source of supply for municipal, industrial, and agricultural needs.

Ground water presently provides 61 percent of total water use reported in Oklahoma, serving about 300 communities. In addition, ground water supplies approximately 80 percent of the water for irrigation. An advantage of ground water in Oklahoma is its

relatively good quality resulting in only moderate treatment for human use (Sparks 1981, 80). However, according to Norman Durham, director of the Oklahoma State University Center of Water Research, the 14 underground reservoirs of water have a combined overdraft, that is, the water in the aquifers is being pumped out and used at a rate faster than the ability of natural sources to replenish the supply. Rick Smith, Chief of Planning of the Water Resources Board, has commented, "In some areas where they have been pumping water for irrigation, they will go dry in the next 10 to 15 years" (Bovee 1983b).

A prime source of ground water is the Ogallala Aquifer which stretches from South Dakota to Texas and underlies portions of western Oklahoma including the Panhandle. In 1977 the water stored in the aquifer was estimated at 59.9 million acre-feet. If usage of the Ogallala continues at the present rate, estimated water storage by the year 2020 will be 29.0 million acre-feet (High Plains Study Council 1982, 17). Although considerable water remains in the aquifer, the economic costs of pumping it could soon make its use prohibitive.

Overdrafting of the Ogallala is of concern to many Oklahomans; and the spectre of a return to dry-land farming becomes more real as the ground water resource is depleted. Agriculture is big business in Oklahoma with the state ranking in the top ten nationwide for winter wheat, grain sorghum, peanuts, and cattle. Irrigation using ground water has played an important role in increasing the productivity of Oklahoma's farmland, making possible an alternative

to dry land farming. In 1981, approximately 875,000 acres of land were irrigated solely for agricultural purposes (Schwab 1983). Seven counties in western Oklahoma accounted for about 80 percent of the state's irrigated farmland, with 25 percent occurring in Texas County alone. In western Oklahoma, this supply is primarily from the rapidly depleting Ogallala Aquifer.

In summary, Oklahoma's water resources are expected to face continuing problems in the west while the east is blessed with an abundance of supply. However, eastern Oklahoma is experiencing problems with outdated and insufficient distribution and treatment centers. Some planning has taken place within the state to try to overcome both current and expected water problems. Future Oklahoma water needs and associated costs are outlined in the 1980 Oklahoma Comprehensive Water Plan (Oklahoma Water Resources Board, 1980a). The plan is the best source on water in Oklahoma. It is used as the basis for this report, supplemented by other documents and interviews, with special emphasis on water needs of Tulsa and Oklahoma City.

WATER DEVELOPMENT NEEDS

Agricultural

Private capital is used for most ground water development to support irrigated agriculture. The development cost using a center pivot irrigation system in western Oklahoma is about $615 per acre, not including operating cost (Schwab 1983). Even most surface water used for irrigation is financed through private funds, and farm owners privately develop their own reservoirs.

The only active federal irrigation project is the Altus reservoir. Beginning summer, 1983, scientists at Oklahoma State University and the U.S. Bureau of Reclamation are conducting a study of the canal and lateral distribution system at Lugert-Altus Reservoir. The results of this study will not be available until winter, 1984. The cost of rehabilitating the system will be included in the final report (Carpenter 1983). The Canton and Waurika reservoirs have been considered for irrigation purposes, but this has not materialized (Schwab 1983).

Dam rehabilitation for ponds, lakes and reservoirs is a related issue. At present, 4,200 dams are under the jurisdiction of the Water Resources Board. Fifty dams are classified as seriously inadequate, either from structural deficiencies or inadequate spillway capacity. The Board's Engineering Division, which coordinates the Oklahoma Safety of Dams Program, indicates an absence of state and federal funds for dam rehabilitation at the present time. No figure is available for the current or future cost of dam rehabilitation in Oklahoma; however, the cost will no doubt run in the millions of dollars.

Statewide

Projections for future Oklahoma water needs were compiled by the Oklahoma Comprehensive Water Planning Committee in the late 1970s. The committee included representatives of the Oklahoma Water Resources Board, the U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, USDA Soil Conservation Service, U.S. Geological Survey and other agencies (Oklahoma Water Resources Board 1980a).

Essentially, historic trends formed the basis for projection of per capita use rate increases for municipal, domestic and industrial water use. However, some future water reusage was computed for urban centers. Table 17 indicates the projected requirements through the year 2000.

In order to meet future water supply needs, the Water Plan proposed water projects in each of eight planning regions in the state. Since supply is abundant in the eastern regions, water development primarily consists of construction and maintenance of water supply systems, including ground water development. A summary of the costs of these recommended projects is presented in Table 18. The problem in the west is one of quantity of water available. Suggested projects in the west included soil conservation system lakes, reservoirs, dams, distribution, and irrigation.

TABLE 17: PRESENT AND PROJECTED WATER REQUIREMENTS
(in 1,000 acre-feet per year)

	1980	1990	2000
Municipal	402.2	556.5	650.8
Industrial	388.3	482.8	554.7
Power	110.9	328.1	477.8
Irrigation	1,514.8	1,976.8	2,295.0
Total	2,416.2	3,344.2	3,978.3

Source: Oklahoma Water Resources Board. 1980, 67.

TABLE 18: SUMMARY OF COSTS-PROPOSED EASTERN REGIONAL DEVELOPMENT (thousands of 1982 dollars)

	Construction	Average Annual OMP&E	Average Annual Costs
Municipal and Industrial Water Supply			
Water supply storage	526,584	6,584	36,969
Ground water development	2,134	261	365
Water conveyance facilities	423,966	20,309	48,946
Terminal storage	13,360	220	977
Subtotal	966,044	27,374	87,257
Irrigation Water Supply			
Water supply storage	45,234	28	2,252
Ground water development	4,641	123	426
Terminal storage	5,509	96	502
Distribution System	86,766	564	4,669
Irrigation wells	143,112	3,677	8,464
Subtotal	285,262	4,488	16,313
Total	1,251,306	31,862	103,570

OMR&E = Operations, Maintenance, Research and Engineering.

Source: Oklahoma Water Resources Board. 1980.

For the total costs of development in all eight regions, the estimates are as follows, in thousands of 1982 dollars (adapted from Oklahoma Water Resources Board 1980a, 76):

Construction	Average Annual OMR & E	Total Average Expenditure
$3,790,475	$47,004	$288,013

The above figures do not include local distribution and treatment facilities.

Water Redistribution

Due to the unequal distribution of water resources in Oklahoma, some planners and politicians have considered the notion of resource redistribution. Therefore, an integral part of the state water plan are the proposed north and south conveyance systems. The systems would transport water from eastern Oklahoma to the more arid west via existing and proposed reservoirs. The proposed systems would transfer 1.2 million acre-feet of water per year through the 630 miles of the northern system and 1.3 million acre-feet/yr over the 500 mile long southern route. While the current likelihood of adoption is remote, it is included here as an example of the theoretical cost of transporting water from east to west. In a recent legislative subcommittee hearing, Rick Smith, planning and development chief for the Water Resources Board, estimated the present total cost of the project at near $10 billion (Table 19).

In anticipation of opposition from eastern Oklahoma, the state water plan also included a special study of water needs of 34 counties in eastern Oklahoma. Full development of eastern Oklahoma's water supply would ensure a more than adequate supply through the year 2040. The cost of this development is shown in Table 20. Ground and surface water resources would be more extensively developed than in the regional plan cited earlier. For example, 100 additional reservoirs are recommended to meet demands forecast by local interests.

TABLE 19: COST OF CONVEYANCE SYSTEM (1978-1980s)
(thousands of 1982 dollars)

	Construction Cost	Average Annual OMR&E	Total Average Annual Equiv. Cost
Northern water conveyance system	$7,294,765	$160,798	$502,479
Southern water conveyance system	3,454,545	72,995	261,570
Total Cost	$10,749,310	$233,793	$764,049

Source: Oklahoma Water Resources Board. 1980.

TABLE 20: SUMMARY OF EASTERN OKLAHOMA WATER SUPPLY SYSTEM COSTS
(thousands of 1982 dollars)

Facility	Construction Cost	Average Annual OMR&E	Total Average Annual Equivalent Cost
M&I Water supply system	$ 769,411	$10,710	$ 55,389
Water supply storage	11,359	955	1,629
Ground water development	515,289	26,172	56,214
Water conveyance	--	--	--
Terminal storage	10,743	170	884
Subtotal	1,306,802	$38,007	$114,116
Irrigation water supply system			
Water supply storage[a]	$ 213,636	$ 2,455	$ 15,666
Ground water development	591,955	22,267	40,909
Water conveyance facilities	231,542	22,451	38,842
Distribution facilities	1,711,432	5,687	51,557
Subtotal	$2,748,565	52,860	$146,974
Total	$4,055,367	$90,867	$261,090

Source: Oklahoma Water Resources Board. 1980a.

[a]Includes cost of terminal irrigation storage in Southeast Region.

REVENUE SOURCES

Federal Funding

The total estimated cost of projects required to meet Oklahoma's water needs, according to the Oklahoma Water Resources Board plan, was about $14 billion in 1982 dollars, not including local distribution and treatment facilities cost. The cost of the conveyance system is included. Funds for financing state and local water projects represent a fraction of these needs (Table 21).

At present funds have been cut back, although the Army Corps of Engineers could have some funds available in the near future to assist Oklahoma water projects. The Bureau of Reclamation has budgeted for three Oklahoma projects: McGee Creek, Mountain Park and the Washita Basin. A total of $2,169,692 has been allocated for the projects for FY 1983 and 1984 (U.S. Dept. of the Interior 1983).

TABLE 21: FEDERAL FUNDS FOR OKLAHOMA WATER PROJECTS

1981	1982	1983
$48 million	$37 million	$27 million

Source: Oklahoma Senate. 1983b.

State and Local Funding

The state provides financial assistance for local water projects through a program administered by the Oklahoma Water Resources Board. The board makes long-term, low interest loans available to communities for any local water development or sewage

project. The loans are financed through the sale of investment certificates and revenue bonds and repaid from revenues generated by the projects and local revenues such as sales tax.

A Statewide Water Development Revolving Fund was established in 1982 to provide additional security and collateral for local water projects. Funded by an appropriation of $25 million from the 1981-82 surplus in the General Fund, the authorizing legislation calls for interest from the fund to go to a grant account which provides assistance to local entities in emergency situations. The grant account has a $5 million ceiling with interest earned above that amount to be returned to the Revolving Fund. The maximum grant payable has been set at $100,000.

The Statewide Water Development Revolving Fund and the other state Water Resources Fund are popular with local governments. As of July 13, 1983, 37 communities had filed applications for loans totaling $37 million, ranging from $40,000 to $4 million. Twenty-one communities applied for grants which totaled $1.3 million. One state senator estimated that the Statewide Water Development Revolving Fund could support $250 million in local projects before the fund would need additional monies (Sewell & Wilson 1983). In addition to federal and state funds, local sources of revenue include water fees (which tend to be notoriously low, not covering the cost of the water, much less capital improvements), general funds, general obligation bonds, penny sales tax and revenue bonds issued by a water authority.

STATUS OF LOCAL WATER SYSTEMS

Other than the information in the state plan, it is difficult to obtain much knowledge of the condition, needs, and costs of local water systems in the state. One source of information on local water systems was collected as the result of an emergency, the summer drought of 1980. The drought created a severe strain on local water systems because the inadequate distribution and treatment systems failed under maximum demand. Communities had to pump water 24 hours a day, leading to frequent breakdowns; larger pumps and more adequate distribution systems were lacking. At the height of the drought, one-fourth (272) of all local systems in the state were classified as having immediate problems. Of those, 181 were critical. In all, 362 communities experienced some curtailment of service during the drought. Estimates of damage ran at $2 million statewide. Most damage was caused by delivery line breakdown, damage to storage facilities and burned out pumps. An estimated $63 million would be needed to rehabilitate and update the local systems (Oklahoma Water Resources Board 1980b).

Other sources discuss problems faced by Oklahoma's public water suppliers. According to the Project 89'er Final Report by the Subcommittee on State-Local Relations (Oklahoma Senate 1983b), approximately 650 municipalities have moderate to severe problems with water treatment and distribution. Another Project 89'er Report for the Subcommittee on Natural Resources indicated that the Water Resources Board identified about 350 communities with water distribution and treatment problems. Of these communities, most of

which are located in eastern Oklahoma, about 80 percent are rural while 20 percent are urban. The estimated cost of correcting these problems over the next few years is estimated to be $400-500 million, according to the Water Resources Board (Oklahoma Senate 1983b, 7).

The Oklahoma Public Water Supply Needs Study (Oklahoma Dept. of Health 1982) involved 1,250 community water suppliers (Community Water Suppliers supply over 10 or more service connections).[1] Of the suppliers, 704 suffered a problem with their system. Suppliers were ranked according to their cumulative score on five factors: presence of primary and of secondary contaminants; quantity and design deficiency; and vulnerability to potential pollution. No financial estimate has been calculated for rehabilitating the systems.

Grant applications for help with water problems is another source of information about local water needs. The Oklahoma Dept. of Economic and Community Affairs is responsible for overseeing small city applications for Community Development Block Grants. The department subsequently dispatches qualified technical personnel to the applying town to evaluate project costs. A brief review of a sample of Community Development Block Grant applications demonstrated the importance of water system rehabilitation or reconstruction as a reason for requesting assistance. Towns requested help with a wide range of water system improvement

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[1]Approximately 1,300 noncommunity suppliers serve service connectors of 2-9 or more than 25 people per day.

projects--new lines, water towers, wells, pumps, and upgrading of old and inadequate systems. Of 22 grants approved between January and July 1983, water projects were involved in one-half, totaling almost one million dollars ($983,974).

Tulsa and Oklahoma City

Finally we will examine the water needs and priorities of the state's two largest cities as described in their capital improvement plans. For the past two years, the Tulsa Water and Sewer Department has operated independently of the General Fund with monies from the sale of services. In FY 82, water receipts totaled $21,734,000, and $24,406,000 is projected for FY 83. Of that sum, anticipated revenue for capital improvements is $6,654,000 for 1984-88, while capital needs equal $91,058,000 (Tulsa 1982). The Long Range Capital Revenue projection which include a $94.3 million general obligation bond approved by voters in May 1983, estimates water revenue of $18,961,000 and needs of $83,926,000 for 1984-88. The most current priority (wish) list for water improvements totals $76,168,000 (Tulsa 1982). The city will need an additional $100 million to construct a 60-inch supply line from Tenkiller Reservoir to the city, if they win the right to do so. At present, the case is in court.

Tulsa (1982) projects <u>minimum</u> capital needs for water supply and distribution at $51,671,000. In addition to the Water Enterprise Fund and the General Obligation Bond, the third penny of sales tax is earmarked for streets, water, and sewer projects.

Oklahoma City has not engaged in capital improvement projects because its citizens have not passed a general obligation bond issue since the 1960s and a third penny sales tax has not yet been approved. Meanwhile the list of capital improvement needs continues to grow. Oklahoma City's needs are described in the capital improvement plan for 1980-84 which is currently being updated. The top five urgent water projects equal $66,369,150 (Table 22).

TABLE 22: OKLAHOMA CITY CAPITAL IMPROVEMENT PROGRAM 1980-84 (currently being updated) (1982 dollars)

Water Resources:	
General Obligation Bonds	$ 23,451,052
Private Gifts	3,069,059
Revenue Bonds	4,902,779
Revenue Sharing	667,053
Self-sustaining Funds	7,239,689
	39,329,632
Total Unfunded Urgent Project	s $ 90,398,631
Total All Projects	$129,728,264

Source: Oklahoma City 1982.

Oklahoma's water systems are in need of improvement and rebuilding. The state legislature and governor have made a commitment to set aside $25 million for the water fund. However, if the state is to meet the demands of today, and certainly those of tomorrow, additional money must be allocated to the development, operation, and maintainence of water projects.

SEWAGE TREATMENT SYSTEMS

Sewage treatment problems have been identified in an estimated 700 towns and cities in Oklahoma. Local sources of funding are limited, and the low priority placed on adequate maintenance of sewage treatment systems has resulted in a rapid and ongoing deterioration of plants and lines. The Environmental Protection Agency estimates sewage investment needs will be $722 million by year 2000. Presently, only $19 million is available in EPA funds. Some assistance is expected from the new Statewide Water Revolving Fund which has the potential to generate $250 million in low interest loans for communities, but the money will be used for water development as well as sewer projects.

BACKGROUND

Oklahoma has a total of 529 municipal treatment facilities with a total capacity of approximately 100 gallons per person per day (Oklahoma Dept. of Pollution Control 1981). Based on current (1983) population projections by the Oklahoma Employment Security Commission, a treatment capacity of 372 million gallons per day will be required by the year 2000.

According to State Health Department official Brent Van Meter (1983), the greatest need for future construction of new treatment plants over the next 20 years will occur in the nonmetropolitan,

suburban areas of Rogers and Wagoner counties in the Tulsa metropolitan area. A regionalized system is recommended for those counties. Because of seasonal population increases, several eastern Oklahoma lakes have need for regional treatment systems; Grand Lake specifically has the greatest need at the present. State Health Department officials stress the need for further investment in treatment facilities in south Oklahoma City if the city is to accommodate expected growth through the year 2000. The actual extent of required investment is as yet unknown.

Over the past ten years federal funds, primarily from the U.S. Environmental Protection Agency (EPA) have provided assistance to many Oklahoma communities for the construction and rehabilitation of sewage treatment plants. EPA grants to Oklahoma municipalities totaled $260 million from 1976 to 1983.[1] Once a treatment system is constructed, its life expectancy is twenty years unless growth causes demand to outstrip capacity.

Despite the aid of federal funds, the sewage treatment needs of Oklahoma cities and towns have not been met. The Project 89'er Final Report of the Subcommittee on State-Local Relations estimated 700 communities were having problems with wastewater treatment in 1982 (Oklahoma Senate 1983b). The Ozark Regional Report indicated 67 percent of community development priorities in Oklahoma are for water treatment facilities (Oklahoma Senate 1983b, 10).

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[1]EPA grants by year are as follows:

1976 - $64 million	1979 - $38 million	1982 - $21 million
1977 - $20 million	1980 - $36 million	1983 - $19 million
1978 - $41 million	1981 - $21 million	

While no overall estimate of sewage investment needs exists, current EPA grant applications can be used to approximate these needs. Such applications presently total $292,393,376 (Oklahoma Dept. of Health 1983). Since that figure represents 75 percent of the necessary funding, total needs represented by EPA grants amount to $389,857,834. Available funds fall far short of that amount. For example, only 18 (8 percent) of the 218 EPA applications can be funded in 1982 due to lack of EPA funds; six have been funded thus far. EPA revenues are expected to continue to decline with approximately $16 million available in each of the next two fiscal years (FY 84 and FY 85). In addition, beginning in 1984 EPA funds will require a 55 EPA/45 local matching ratio, substantially increasing the cost to local governments. One can expect many communities will be unable to afford their share of the funding. Other federal funds are available through the Farmers Home Administration and the Department of Housing and Urban Development. In 1982, Farmers Home Administration and Housing and Urban Development federal grant applications for assistance with sewage treatment plants totaled $733,772 (Oklahoma Dept. of Economic and Community Affairs 1983).

Current Community Development Block Grant applications in the Department of Economic and Community Affairs further demonstrate the needs of local governments for wastewater treatment assistance. Three of the twenty-two approved projects for 1983 will assist towns in various aspects of wastewater treatment rehabilitation. These projects total $231,456.

The only state funding available to address sewer treatment plant needs is through the $25 million Water Resources Fund. While the interest from the fund is available for emergency grants, the fund itself is used to guarantee loans for local governments in meeting their capital improvement needs.

In the opinion of Brent Van Meter (1983), an important issue is the lack of adequate funding by local units to maintain their treatment plants properly, once constructed. Federal funds and state funds may assist local governments in construction, but it is up to the localities to budget monies for proper maintenance. Because of the low priority sewage treatment facility maintenance has in the eye of local people and local officials, maintenance is delayed and plants deteriorate rapidly.

Tulsa and Oklahoma City

The state's two largest cities have estimated capital improvement needs for sewage treatment. The Oklahoma City Municipal Facilities Authority finances sewage projects requiring multi-year contracts. Although anticipated revenues from 1980-83 total $145,239,558, none of that money is budgeted for capital expenditures, (actual and proposed expenditures equal $193,199,403). However, according to the 1980-84 City of Oklahoma City's Capital Improvements Programs 1980-84, "urgent" wastewater projects total $240,754,884, of which $46,341,056 is money on hand, mostly from federal sources. The top five priority projects are expected to cost $73,064,160, including 1.5 million for sludge disposal and $71,564,160 for sewer treatment needs.

The City of Tulsa Sewer Enterprise Fund is expected to finance smaller capital projects and larger scale projects in conjunction with debt instruments (City of Tulsa 1982). Sewer rates generated revenues of $10.4 million in FY 82 with $10.85 million projected in FY 83. Tulsa must comply with water quality standards which will require the rehabilitation of two sewage treatment plants. These projects will cost about $63,500,000. Minimum capital needs for sewage improvements and construction are projected at $71,291,000 over the next five years (City of Tulsa 1982).

A $94.3 million bond issue was passed in May 1983; of this, $31.3 is earmarked for the mandated improvements and sludge drying beds and is to be spent over the next four fiscal years. The city hopes to receive $12 million in EPA matching grants, but given the cutbacks, that would appear to be an overly optimistic figure (City of Tulsa 1982). The revised plan enumerates sewer needs which total $82,332,000. Present departmental estimates, excluding sludge management, total $56,785,000.

Based on our research, we estimate total statewide sewage investment needs to be at least $714 million. The EPA estimates that these needs will grow to $724 million by 2000 (EPA, 1980 Needs Survey) and future revenues are entirely inadequate to meet these needs.

SOLID AND HAZARDOUS WASTE MANAGEMENT

Summary

Solid waste disposal is a state-wide problem in Oklahoma. Virtually every county faces problems associated with where and how to dispose of increasing quantities of waste. It is estimated that statewide costs for disposal will be from $17 million to $30 million yearly. Although it is not known how much is currently spent, it is generally agreed that the levels greatly exceed the sanitation fees charged by municipalities.

BACKGROUND

Hazardous waste[1] is generated from nearly 500 sources in Oklahoma. Large disposers generate up to 15 million gallons of waste per month while small disposers are more likely to generate around 8 million gallons per month. Two commercial facilities and about 60 private facilities, most serving a single industry, dispose of this waste.[2] Hazardous waste disposal is financed privately.

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[1]For the purposes of this report, solid waste disposal will be considered as disposal of hazardous waste, other industrial waste, wastewater sludge, and residential, commercial, and institutional solid waste.

[2]The Oklahoma Solid Waste Management Plan of 1980 cited the following figures: 700 generators, 200 transporters, and 50 treatment, storage, and disposal sites. The information in the text is taken from an interview with officials of the Oklahoma Department of Health: Donald Hensch, Director, Industrial and Solid Waste Service, Industrial Waste Division; Richard Thompson, Director, Industrial and Solid Waste Service, Solid Waste Division; and H. A. Caves, Waste Management Services.

"Other industrial waste" consists of such residue as fly ash and foundry sand. It is not possible to obtain an estimate of the quantity of such waste generated in Oklahoma (Hensch 1983). Thirty private sites handle this type of waste. The market for other industrial waste fluctuates; an industry may dispose of the waste one month and sell it all another. Occasionally, a small city landfill will dispose of this type waste for a local industry.

Residential and commercial solid waste is disposed of in the 250 municipal and private landfills in the state. The cost of solid waste disposal is not normally covered by the sanitation rate charged by municipalities. Waste experts at the State Dept. of Health (Mr. H. A. Caves, Mr. Donald Hensch, and Mr. Richard Thompson) estimate that about 30 percent of the actual cost is subsidized by other municipal revenue sources. Cost is estimated at $6/ton for a poor operation and $10/ton for a good operation. From 8,000 to 10,000 tons of waste are processed per day in Oklahoma. Disposal is figured at a rate of 300 days per year, resulting in the state-wide estimate of $17 to $30 million annually. Based on a no-growth assumption, trash disposal costs from 1983 to 2000 would range from $311 million to $540 million.[1]

One study conducted at the Oklahoma State University estimated the cost of waste disposal in western Oklahoma counties at $6/$7 per month per capita. At that rate, disposal costs would be about

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[1]According to an undated study by the Midwest Research Institute (prior to 1975) cited in a textbook (General Electric 1975, 7) the net cost/input ton for a sanitary landfill close-in is $2.57; for a remote sanitary landfill it is $5.94, based on a city owned, 1,000 ton/day plant open 300 days/year.

$21 million per year. In addition to the assumption of no growth, these costs do not include the increased costs of new or improved technologies, the cost to the Department of Transportation of picking up litter along the roads or the costs associated with health, economic, or environmental impacts.

Even though illegal open dumping is a problem in Oklahoma, particularly in the rural areas, in 1983 the EPA Inventory of Open Dumps enumerated 61 open dumps in Oklahoma (U.S. EPA 1983).

Disposal of municipal sludge is a problem for cities with sewage treatment plants. Oklahoma presently has legislation providing municipalities with three options for sludge disposal: landfill, agricultural reuse, and soil reclamation.

There are few other sources of information about solid waste costs in Oklahoma. Grant applications seldom include requests for assistance with sanitary landfills although a few Community Development Block Grants applications filed at the Department of Economic and Community Affairs mentioned this need. The City of Eufaula was granted Community Development Block Grant assistance this spring amounting to $71,188 toward the development of a new municipally-owned landfill.

TULSA AND OKLAHOMA CITY

In its 1982-83 budget, Oklahoma City budgeted for $8,845,379 for sanitation services. Expenditures for 1979-1982 amounted to $13,310,593. Refuse revenues amounted to $8,123,836 in 82-83. Capital outlay was nonexistent in FYs 79-80 and 81-82, extremely

meager ($4,896) in FY 80-81, and only $1,134 in FY 82-83. An urgent priority in the 1980-84 capital improvement plan is a new sanitary landfill for the city with a price tag of $1,460,000, of which $160,000 was funded. Also considered urgent is a sludge disposal project costing $1.5 million.

Most Tulsa trash pick-up is managed by private collectors; consequently their sanitation budget is low compared to Oklahoma City's. Refuse management is anticipated to cost $1,731,872 in FY 83-84 while revenues amount to $2,330,000. No capital outlay is being made for solid waste disposal. Tulsa will soon be the site of a privately funded incinerator which is to take care of Tulsa's waste disposal for the next 20 years. The incinerator will generate steam which will be sold to various concerns. The cost of the incinerator is estimated at $45 million. While Tulsa is not concerned with the development of sanitary landfills as a method of waste disposal, it has capital investment needs for sludge disposal. In the current estimates of desired capital improvements, several sludge projects, drying beds and hand facilities, are suggested, totaling $36,133,000. Until these new sludge disposal systems are implemented, estimates for disposing of the sludge through a private contractor run about $3 million annually.

Solid waste disposal is a state-wide problem in Oklahoma including rural areas. Disposal is a mix of private and public enterprises which are very much locally controlled. The cost of disposal is not normally covered by collection fees. A law passed in 1983 enables local governments to work together to establish solid waste disposal districts and to tax for such service.

SUMMARY

INTRODUCTION

Rapid economic growth and urbanization over the past decade have placed considerable pressure on Oklahoma's infrastructure. Maintenance and upgrading of urban infrastructure has not kept pace with metropolitan growth, and the shift of population and income from rural to urban areas has deprived rural counties of needed resources to maintain an adequate infrastructure. The financial resources needed to meet these needs is substantial. Current revenues are inadequate, thus, Oklahoma's infrastructure problems for both rural and urban areas are likely to increase in the foreseeable future.

INVESTMENT NEEDS AND REVENUES

Several difficulties exist in estimating Oklahoma's total long-term infrastructure needs and available revenues. These include:

- No comprehensive, systematic inventories exist of rural and municipal needs for roads, sewers, solid waste disposal, and water development. Cities and counties have the primary responsibility for addressing these needs but do not, for the most part, engage in infrastructure planning due to a lack of expertise, personnel, and a generally skeptical attitude about the utility of such exercises.
- Of the infrastructure plans that do exist, few are concerned with long range needs. Although some state agencies do plan for infrastructure needs (highways, water) through the year 2000, few city or county plans extend beyond a five year-period.

- There are no integration, coordination, or planning activities across infrastructures which makes it very difficult to determine and assess the cumulative affects of the incremental increases in need for each infrastructure.

- Estimates of future revenues are very uncertain. Many local governments lack sufficient revenue sources and often depend on the state for assistance with major capital projects. The capacity of the state to provide assistance depends on state tax collections which are, in turn, highly dependent on the prosperity of the somewhat unstable oil industry. In addition, cutbacks and uncertainties in federal funding levels makes revenue projections even more difficult.

Based on available state and local data, 1983 infrastructure needs are estimated to be at least $11.9 billion (tables 23 and 24). On the other hand, the total revenue currently available to meet these needs is only $804 million. Between 1983 and 2000, infrastructure needs are projected to total approximately $19.7 billion with about $11.3 billion of revenue available to meet these needs.

The actual infrastrucuture needs as outlined in tables 23 and 24 are probably underestimated, as is the size of the long term deficit between needs and revenues. This is due, in large part, to the fact that highway needs and revenues account for the major portion of the data in the table and are the only needs projected through the year 2000. A large percentage of the revenue and the increase in the percentage of revenue from federal sources is due to money coming back to the state as mandated by the Surface Transportation Act. In most other infrastructure areas, the level of federal funding is decreasing. The tables also do not include infrastructure needs for rural counties and small towns or the revenues that could be raised by these governments to meet their needs. As noted

TABLE 23: CURRENT KNOWN INFRASTRUCTURE NEEDS AND REVENUES, 1983-2000
(millions of 1982 dollars)

	Total Infrastructure Needs	Total Available Revenues for Infrastructure Purposes				
		State	Federal	Local	Total	Deficit
1983	11,920	452	182	169	804	11,117
1983 - 2000	19,757	7,956	3,092	234	11,283	8,475

TABLE 24: CURRENT KNOWN INFRASTRUCTURE NEEDS BY CATEGORY, 1983-2000
(millions of 1982 dollars)

Category	1983	1983-2000
Highways	$ 4,791	$11,224
Bridges	1,372	1,372
Railroads	129	129
Airports[a]	7	7
Water	4,791	5,675
Sewers	714	724
Solid and Hazardous Waste	116	626
Total	$11,920	$19,757

[a]Airport estimates include only currently planned investment. They do not include general aviation airport needs.

previously, virtually no long range planning is conducted in rural areas, and little information exists about future needs. This lack of information is especially important given the projections of an 18 percent growth in Oklahoma's population between 1980 and 2000. Finally, the tables do not include data pertaining to the needs and expected revenues of the 207 small general aviation airports. A needs assessment for these airports is currently underway.

The following section briefly summarizes the findings concerning needs and revenues for each of the individual infrastructures.

Highways

Over 4,500 miles of the state highway system are now in an inadequate condition. Seventeen miles of interstate have yet to be built, and 69 miles of new roads are critically needed. It is estimated that $4.26 billion will be needed to bring the system up to the State Department of Transportation's adequacy standards. An additional $1.53 billion will be needed to renovate and rebuild obsolete highways between 1984 and 2000, and $4.27 billion will be needed to cover maintenance, engineering, and administration costs. While total state highway needs amount to over $10 billion, only about $7.68 billion will be available from all revenue sources. In addition to state highway needs, Oklahoma City and Tulsa have road needs totalling an estimated $336 million over the next 17 years. Total municipal and rural needs in the rest of Oklahoma are unknown.

Airports

Oklahoma has sufficient airports to service current demand. Will Rogers World Airport and Tulsa International can finance internally all needed investment. General aviation airports are in a much worse condition, many are very badly maintained, and current revenue sources cannot finance needed improvements. The extent of needed investment is unknown; however, the State Aeronautics Commission is in the process of conducting a needs assessment in order to update the Oklahoma Air Plan.

Mass Transit

Oklahoma has no light rail passenger systems, and only Tulsa and Oklahoma City have large bus systems. Internally generated revenues do not begin to cover municipal bus operating costs. Federal subsidies, which are scheduled for termination in 1985, are a vital source of revenue for the systems.

Water

Investment needs for water resources development are estimated to be nearly $3.8 billion. In addition, 350 communities have water distribution and treatment problems. It is estimated that $400-500 million is needed to rectify these problems. About 700 communities have water supply problems ranging from contamination to insufficient capacity. No estimate of the cost to reduce these problems exists.

Sewage Treatment Systems

Nearly 700 Oklahoma towns and cities have sewage treatment problems, and low local investment has led to a rapid deterioration of plants and lines. Based on 1983 grant applications to state and federal funding sources, current sewer needs are estimated to be over $714 million. The EPA estimates total sewage investment needs will grow to $724 million by 2000. Some of the $250 million in the Statewide Water Revolving Fund will be available as low interest loans to community sewer projects. However, this money will be shared with water development projects.

Solid and Hazardous Waste

Solid waste disposal is a state wide problem. Disposal costs are estimated to be between $17 million and $30 million annually. Experts agree that municipal sanitation fees do not cover disposal costs.

Bridges

Over half of Oklahoma's bridges are in an inadequate condition. Many are completely unsafe, particularly in rural areas. Total 1983 bridge needs are estimated at $1.37 billion, while $42 million has been appropriated to the County Bridge Program. No projections of future bridge needs have been made.

Railroads

The decline of rail service and track abandonment is a serious problem in Oklahoma, particularly since the collapse of the Rock Island Railroad. Total railroad rehabilitation needs are now

estimated to be $129 million. The legislature has responded by appropriating $22 million for line acquistion and rehabilitation of the Rock Island Railroad. In addition, between 1978 and 1982 the legislature appropriated $4 million from the Oklahoma Freight Car Tax to establish the Railroad Maintenance Revolving Fund for line rehabilitation. Six million dollars in federal funds for line rehabilitation and rail planning has been available since 1977. There are no projections of future railroad needs, but it is likely that the situation will become more serious in the future.

CONCLUSIONS

Three major impediments to infrastructure maintenance exist:

1. Many local governments lack the information and expertise to assess the condition of their infrastructure. Without this information it is impossible to develop a systematic response to total infrastructure problems.

2. Local governments, especially in rural areas, lack the expertise and personnel to assess future needs and plan their response to them.

3. Almost all levels of government lack the financial resources to address infrastructure needs. The restrictions the state constitution places on bond sales severely limit their spending capacities. Declining federal funding is likely to make this problem worse. If Oklahoma is to experience any extensive infrastructure renovations, state spending must increase.

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